

the area. The vegetation types include forests of conifers (*Picea excelsa* pure or mixed with *Abies alba*) and deciduous trees, wooded pastures, meadows, hydrophilous formations, peat-bogs, formations on rocks, screes and stony ground, and cultivated land. These are dealt with in detail, the descriptions and lists being illustrated by photographs reproduced as plates and text-figures. A large-scale map of the vegetation zones of the Lac des Taillères indicates the detailed nature of the survey. The most striking feature of the publication is, however, a folding map in a dozen colours of the whole area on the scale of 1:25,000. The map not only shows the distribution of the types of vegetation, but also, by means of symbols, that of the more important species.

The pollen-grain analyses of peat deposits has provided a basis for an account of the evolution of the vegetation. The plant life was completely destroyed during the Riss glaciation and without doubt also at the return Würm glaciation. About 15,000 B.C., *Pinus montana* and birches occupied ground left by the retreating ice. Later (about 12,000 B.C.) *Pinus silvestris* entered the area and was followed (11,000–9,000 B.C.) by hazel, oak and hornbeam. Other broad-leaved trees gave a more mixed forest from 9000 until 6000 B.C., while the fir, spruce and beech were late immigrants.

W. B. T.

*Handbuch der biologischen Arbeitsmethoden.* Herausgegeben von Prof. Dr. Emil Abderhalden. (1) Lief. 392. Abt. 6: *Methoden der experimentellen Psychologie.* Teil D, Heft 3 (Schluss): *Vergleichende Tierpsychologie.* Pp. 233–427 + ix. 11 gold marks. (2) Lief. 395. Abt. 9: *Methoden der Erforschung der Leistungen des tierischen Organismus.* Teil 6, Heft 2: *Methoden der Meerwasserbiologie.* Pp. 195–366. 10 gold marks. (Berlin und Wien: Urban und Schwarzenberg, 1932.)

(1) In this memoir are recorded the methods and results of the principal lines of experimentation designed to test observation, memory and the reactions of animals. More than half the work is devoted to the consideration of vertebrate animals, fish, rats, dogs, monkeys, etc., and the rest of the work, which is perhaps of more particular interest to zoologists, to the invertebrates. Experimental work on the reactions of the latter is considered in systematic order, beginning with the Protozoa and passing successively to the echinoderms, annelids, molluscs, crustaceans, arachnids and insects—a very useful summary of present knowledge.

(2) This is a useful account of the various devices which have been found serviceable in the rearing of marine fishes either in scientific experiments or in economic culture. The methods of collection of eggs, fertilisation, the various forms of aquaria and other breeding vessels and the food of fish larvæ are first considered. In the next twenty pages are described some of the principal

methods applicable in the laboratory to the keeping or rearing of marine fish for experimental work; for a score of different species the technique which investigators have found most successful in each case is set forth in a clear and helpful manner. The concluding part of the work is devoted to economic fish culture and cognate matters.

*Opere di Paolo Celesia. Serie scientifica.* Vol. 3, Serie 1: *Nuovi studi biologici.* Pp. viii + 532. (Roma: Libreria di Scienze e Lettere, 1932.) 35 lire.

THIS is a further instalment of the biological studies of Paolo Celesia, who died in Rome in 1916 at the age of forty-four years. The first volume of his biological studies appeared in 1923 and contained eleven original memoirs together with reprints of a number of reviews. The present volume is a collection of about ninety articles or notes written during the author's last years, which record his views and reflections, with the place and date of writing. The notes range in length from a page to twenty pages, and from their manner of production have no continuity, but those on cognate subjects have been grouped to form seven chapters. The principal are on life and death, on sexuality and reproduction and on hermaphroditism, which together occupy about two-thirds of the volume. These are followed by chapters on asymmetry and on the abyssal fauna. Many of the notes are in the form of critical or speculative considerations arising out of the author's reading. The volume is a memorial of the author's contemplations on a considerable range of subjects.

*An Introduction to Zoology: through the Study of the Vertebrates with Special Reference to the Rat and Man.* By Prof. Zeno Payne Metcalf. Pp. xix + 425. (London: Baillière, Tindall and Cox, 1932.) 20s.

AIMING at the education of the beginner in zoology, this "Introduction" selects a single mammalian type, a rat, the functions and related structures of which are considered in detail. Towards this central theme, by noting contrast or similarity of parts, are drawn a number of other vertebrate animals, but apart from this and an introductory chapter of 14 pages, no account is given of the characters or relationships of invertebrate and vertebrate groups. On the other hand, stress is laid upon discussions of more general subjects, such as locomotion in animals, heredity, animal behaviour; and almost one-third of the book is given up to a simple treatment of philosophical zoology.

The book has good points; it is concise, is simply written, and contains some instructive diagrams, but to our mind its deliberate plan fails in that it lacks that minimum solid substratum of comparative zoology upon which a sound superstructure of general principles can be erected.

J. R.